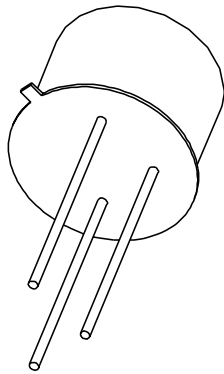


DATA SHEET



BC160; BC161 PNP medium power transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 May 12

PNP medium power transistors

BC160; BC161

FEATURES

- High current (max. 1 A)
- Low voltage (max. 60 V).

APPLICATIONS

- General purpose applications.

DESCRIPTION

PNP medium power transistor in a TO-39 metal package.
 NPN complements: BC140 and BC141.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector, connected to case

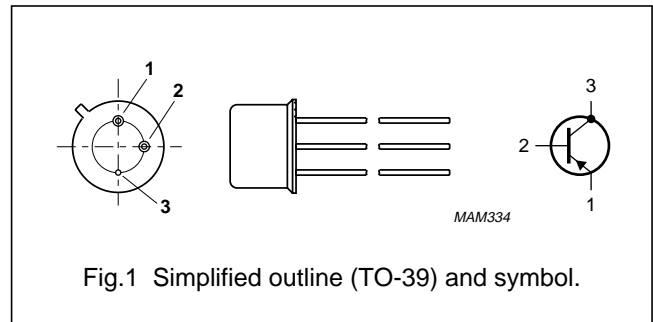


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter				
	BC160		–	–	–40	V
	BC161		–	–	–60	V
V_{CES}	collector-emitter voltage	open base				
	BC160		–	–	–40	V
	BC161		–	–	–60	V
I_{CM}	peak collector current		–	–	–1.5	A
P_{tot}	total power dissipation	$T_{case} \leq 45\text{ }^{\circ}\text{C}$	–	–	3.7	W
h_{FE}	DC current gain	$I_C = -100\text{ mA}; V_{CE} = -1\text{ V}$				
	BC160-10; BC161-10		63	100	160	
	BC160-16; BC161-16		100	160	250	
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	50	–	–	MHz

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LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter	–	–40	V
	BC160			–60	V
V _{CEO}	collector-emitter voltage	open base	–	–40	V
	BC161			–60	V
V _{EBO}	emitter-base voltage	open collector	–	–5	V
I _C	collector current (DC)		–	–1	A
I _{CM}	peak collector current		–	–1.5	A
I _{BM}	peak base current		–	–200	mA
P _{tot}	total power dissipation	T _{case} ≤ 45 °C	–	3.7	W
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	175	°C
T _{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-a}	thermal resistance from junction to ambient	in free air	200	K/W
R _{th j-c}	thermal resistance from junction to case		35	K/W

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CHARACTERISTICS

$T_{amb} = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0; V_{CB} = -40\text{ V}$	–	–10	–100	nA
		$I_E = 0; V_{CB} = -40\text{ V}; T_j = 150\text{ °C}$	–	–10	–100	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = -5\text{ V}$	–	–	–100	nA
h_{FE}	DC current gain BC160-10; BC161-10 BC160-16; BC161-16	$I_C = -100\text{ }\mu\text{A}; V_{CE} = -1\text{ V}$	–	80	–	
			–	120	–	
h_{FE}	DC current gain BC160-10; BC161-10 BC160-16; BC161-16	$I_C = -100\text{ mA}; V_{CE} = -1\text{ V}$	63	100	160	
			100	160	250	
h_{FE}	DC current gain BC160-10; BC161-10 BC160-16; BC161-16	$I_C = -1\text{ A}; V_{CE} = -1\text{ V}$	–	20	–	
			–	30	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -1\text{ A}; I_B = -100\text{ mA}$	–	–0.6	–1	V
V_{BE}	base-emitter voltage	$I_C = -1\text{ A}; V_{CE} = -1\text{ V}$	–	–1	–1.7	V
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	–	30	pF
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = -0.5\text{ V}; f = 1\text{ MHz}$	–	–	180	pF
f_T	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -10\text{ V}; f = 100\text{ MHz}$	50	–	–	MHz
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	$I_{Con} = -100\text{ mA}; I_{Bon} = -5\text{ mA}; I_{Boff} = 5\text{ mA}$	–	–	500	ns
t_{off}	turn-off time		–	–	650	ns

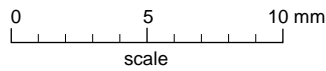
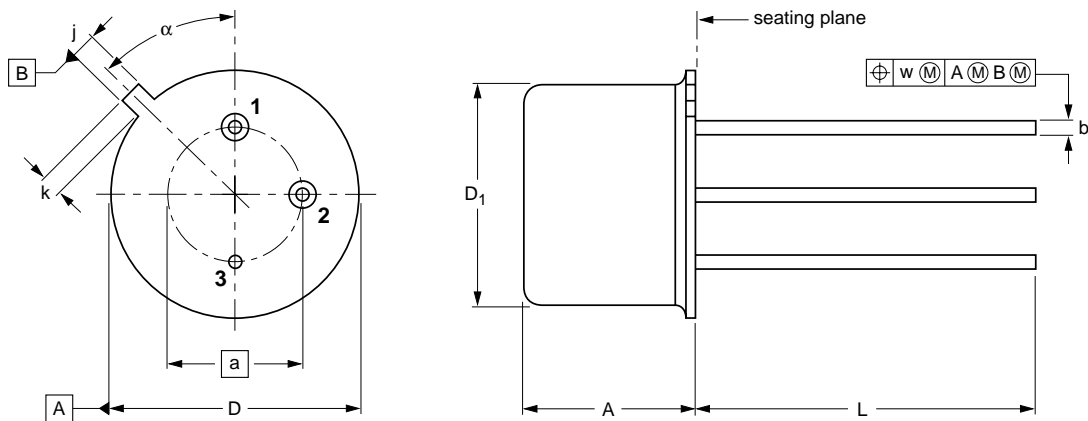
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PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads

SOT5/11



DIMENSIONS (mm are the original dimensions)

UNIT	A	a	b	D	D ₁	j	k	L	w	α
mm	6.60 6.35	5.08	0.48 0.41	9.39 9.08	8.33 8.18	0.85 0.75	0.95 0.75	14.2 12.7	0.2	45°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT5/11		TO-39				97-04-11

PNP medium power transistors

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DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.